

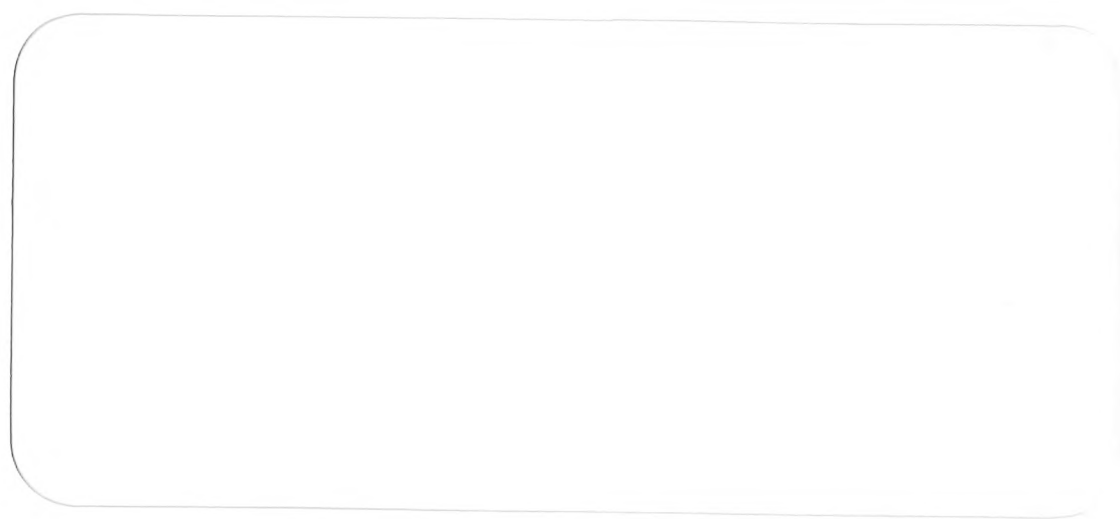
Faculty Working Papers

MALNUTRITION AND MARKETING

Jagdish N. Sheth and Seymour Sudman

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MALNUTRITION AND MARKETING ¹

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Our objective in this paper is to explore the role of marketing concepts and practices to solve the problem of malnutrition on a global basis. We intend first to show how malnutrition has reached crisis levels especially in less developed countries. Even though the problem of nutrition cannot be fully separated from those of population and food supply, we intend to show how nutrition is likely to be even a more difficult societal problem. Third, we shall isolate protein deficiency as the single most critical problem in nutrition and review sources of protein and their relative efficacies. Fourth, we intend to show how protein can be injected in the normal food consumption habits of people and why certain types of protein enrichment programs may not be successful. Finally, we will concentrate on the role of marketing in assisting the industry, the government and the professionals working in the area. In this regard, we shall examine the relative contribution of each marketing mix toward solving the nutrition problem.

THE GLOBAL CRISIS OF MALNUTRITION

In his annual address to the World Bank Board of Governors in 1971, Robert McNamara summarized his concern as follows: "The argument I shall make is that (1) Malnutrition is widespread. (2) It is a major cause of high mortality among young children. (3) It limits the physical - and often the mental - growth of hundreds of millions of those who survive. (4) It reduces their productivity as adults. (5) It is therefore a major barrier to human development."

"The deprivation often begins before the child is born. In the last three

months of pregnancy, and the first two years after birth, a child's brain reaches nearly 90 percent of its structural development. During this critical period, a deficiency of protein can impair the brain's growth. Autopsies have revealed that young children who die of protein-calorie malnutrition may have less than half the number of brain cells of adequately nourished children in the same age group."

"We are not speaking here of dietetic nuances, or the fancies of food faddists. We are speaking, instead, of basic nutritional deficiencies which affect the minds and bodies of human beings. But the problem is so dimly perceived, so readily dismissed under the pressure of other priorities that we have neither applied the knowledge now at hand, nor mobilized the resources required to broaden that knowledge further" (McNamara 1971).

"In Zambia, in Africa, 230 of every thousand babies born are dead before their first birthday. In India and Pakistan the ratio is 140 of every thousand; in Colombia it is 32. Many more die before they reach school age; others during the early school years." (Brown 1970, p. 135).

"In some countries 50 percent of the babies die between the ages of two and six, largely because of malnutrition. This fact is hidden in the statistics of a developing country because of diarrhea, parasites, and diseases of that kind are recorded as being the cause of the children's death. But they actually die of protein-calorie malnutrition. If they were well nourished they would not die" (Sebrell, 1966, P. 95).

Although there are no accurate figures, it is estimated that upto 50 percent of the population of the less developed countries is inadequately nourished (President's Science Advisory Panel, 1967). In view of the fact that the world population is

concentrated among the less developed nations, this means that almost one third of the world population is under nourished. Furthermore, the problem of under nourishment is most acute among children. It is estimated that more than three million children die annually from malnutrition. In short, the crisis of malnutrition. In short, the crisis of malnutrition is a major crisis of mankind and his survival.

ANTECEDENT FACTORS OF POPULATION AND FOOD SUPPLY

Certainly there is very little point in discussing the problem of nutrition without first solving the more fundamental problems of overpopulation and food shortage. If there are insufficient calories, it makes little sense to talk about nutrition or health. However, we believe that population control and food supply are at best antecedent conditions and even if they could be solved, there is no guarantee that malnutrition will not remain a global problem. Certainly this has been well documented in most advanced economies where population is not a serious problem and the food supply is plentiful and yet the lack of nutrition in foods is alarmingly high. It is estimated that even in the United States with its highest per capita income in the world, there are at least 20 million people who remain undernourished.

A number of factors suggest that crises of overpopulation and food shortage may be solved in the near future and therefore, the major crisis confronting us may be malnutrition.

First, by 1970 the world population totaled 3.6 billion and the rate of growth was 2.1 percent per annum (AID 1970). This is certainly an alarming rate and cannot

be sustained unless other aspects of human life are examined at the same time. While the population has been growing at an alarming rate, the industrial output of the world has been growing even at a faster rate. For example, the average growth rate of industrial output between 1963 and 1968 was 7 percent per annum and 5 percent per annum on a per capita basis. Thus it seems that we seem to have, at least at the present time, the capacity to product at the same or higher rate than population growth.²

Second, it is argued, and rightfully so, that while the world industrial output is sufficient to sustain the world population, there are large inequities in the distribution of wealth between rich and poor countries. There seems to be, in fact, a negative correlation between population growth and economic growth among countries and hence the per capita economic gap is indeed widening between the rich and poor countries (Kuznets 1971). However, we have witnessed strong political and economic incentives in the recent years to encourage the richer countries to part with their surpluses in the form of massive food assistance programs and economic aid programs. This has at least allievated mass starvations in less developed countries in the last two or three decades. We think it is in the self interest of richer countries to continue to offer massive food assistance in times of acute shortages in less developed countries due to famine or floods.

Third, it is generally conceded that continued food assistance simply attacks the symptoms rather than the causes (Gregory 1969). Furthermore, it is now recognized that export of food surpluses may prove dysfunctional in its effects. Fortunately, these factors have led to the transfer of agricultural technology to the less developed countries. This has included better farming practices and equipments as well as development of high yield strains of cereals such as wheat,

rice and corn. At least, we seem to experience some hope that the "green revolution" has taken grass roots support in countries such as India which point toward self-sufficiency in food supply to anticipated additional population.

Fourth, it is indeed a pleasant surprise to see that population growth in less developed countries has been stemmed, at least to some extent, by concentrated efforts of the governmental agencies and industry. Much of this has recently been attributed to the marketing orientation of population control programs. In short, we see some hope that with proper communication and education population can be controlled.

Finally, the problem of nutrition seems more subtle than either population control or food supply. The latter at least have a visible impact which can be directly observed and understood by the layman. Malnutrition, on the other hand, is more subtle and less visible in its impact, and its consequences in terms of mental and physical disabilities are more painful and longer in duration. Unfortunately, it is difficult for the layman to associate nutritional deficiency to a number of mental and physical disabilities. There are too many alternative explanations to directly link malnutrition to disabilities, sickness and even death.

The above discussion is in no way intended to minimize the problems of population and food supply. We simply wish to make a point that the recent efforts seem to be paying off in stemming these problems and comparable efforts are badly needed in the area of nutrition.

PROTEIN DEFICIENCY AND NUTRITION

The problem of malnutrition is basically a problem of protein deficiency.

Proteins are the basic building blocks of life. All the tissues in the body, the muscles, the blood-clotting fibrinogen, the enzymes, and the chromosomes are proteins. Protein is therefore essential to life. However, the human body can produce only some of its own protein from amino acids but it is lacking in eight amino acids essential to human life. These amino acids need to be supplemented from the intake of food that man eats. Unfortunately, not all foods are rich in protein and thus there is no guarantee that abundance of food supply will automatically ensure protein supply. For example, most cereals tend to be poor in protein content while meats are plentiful in protein content. Furthermore, protein deficiency in early childhood is permanent in its effect. There is very little that one can do to correct for the damage in later life. Thus, unlike other nutritional elements such as vitamins, iron, calcium phosphorous, etc. Protein is neither commonly present in diets of people living in less developed countries nor can its deficiency be corrected by subsequent treatments.

Protein deficiency is clinically known as kwashiorkor and marasmus. In kwashiorkor type of deficiency, the caloric intake is usually adequate or near adequate but the protein is inadequate. In marasmus type of deficiency, both the protein and calorie intakes are inadequate. Therefore, it is a more serious deficiency.

Protein deficiency is especially acute in pregnant and lactating mothers and in their infants and growing children. (Ahmad 1967) Pregnant and lactating women require much more protein per day than full grown men as can be seen from table 1. For example, lactating women require 38 percent more protein than men and 67 percent more than other women. Similarly, teenage boys require more protein than grown men.

TABLE 1 DAILY PROTEIN REQUIREMENTS

	Recommended Daily Protein Allowance (grams/day)*		Minimum Protein Requirements (grams/kg. body weight)** (NPU=70)
Men	18-75	70.0	0.84
Women	18-75	57.9	
	Pregnant	77.2	
	Lactating	96.5	
Infants	0-1	19.3	1.25
Children	1-3	31.2	
	3-6	41.0	
	6-9	53.1	
Boys	9-12	60.3	1.16
	12-15	74.8	
	15-18	84.5	
Girls	9-12	55.5	1.10
	12-15	62.7	
	15-18	57.9	

*Calculated from Taylor and Pye, Foundations of Nutrition, p. 500.

**From Kamaluddin Ahmad, "Protein Needs and Its Deficiency in Asia," Proceedings of International Conference on Soybean Protein Foods, p. 48.

However, it is the infants and young children who have the most serious need of protein per kilogram of body weight. It is this early years that most of their brain and body growth takes place and therefore, it is especially critical to obtain adequate supply of protein.

The most common source of protein for the infant in underdeveloped countries is breast feeding. Unfortunately, often the lactating mothers themselves are deficient in protein and hence their milk is not enriched as one would like. The protein deficiency is therefore, a leading factor in the high infant mortality rate in less developed countries.

The growing child reaches another crisis in his battle for survival at the

time of weaning. He gives up breast feeding and begins to share the family pot. Often the food is a soup or stew made up of all the food that could be obtained that day. The child, with only a small appetite, needs a high concentration of protein in his diet to meet the extremely high bodily demands for protein. In those critical years, a child between the ages of one to three needs one and half times more the amount of protein per kilogram of body weight than a full adult. On the other hand, the family pot tends to be scarce in protein often not containing enough daily requirements of the adult. This protein deficiency stunts his mental and physical growth and makes him susceptible to disease.

REVIEW OF HIGH PROTEIN FOODS

The "green revolution" caused by the high-yield crops previously discussed has helped eliminate starvation in those countries where they have been used. But cereals contain only a relatively small percentage of protein. So although they have helped to supply much needed calories, they have done relatively little to solve the greater problem of protein malnutrition.

The problem in developing countries is that the bulk of the food eaten is cereals. Whereas in the United States 91.6 percent of the protein consumed is supplied by animals, only 11.4 percent of that of all Asia is in the form of animal protein. (Ahmad 1971) And there is a difference in quality between animal protein and cereal protein. What this effectively does is to require many more grams of cereal protein be consumed to be nutritionally equivalent to a much smaller amount of animal protein. So an individual on a predominantly cereal diet loses in two ways. He not only must eat much more cereal to get the same amount of protein as

found in a smaller amount of meat, but he must eat still more cereal because of the quality differences in the protein itself. This problem is most serious among the young children who need the protein the most. Even assuming that an adequate supply of cereals existed so that a child could eat all he could consume, he would become full before he had received an adequate supply of protein for his growing needs.

But why then not raise cattle, pigs, and other sources of animal protein to fill these needs for protein? One reason involves custom, for example in India, where one out of every seven people in the world lives, a large percent of the population is Hindu. Most caste Hindus are vegetarians and do not consume meat. Even in other developing countries where there are not religious taboos against meat, the traditional meals include very little meat. Since nutrition generally has very little meaning to the people other than being full or hungry, they are little motivated to include more meat even if it were available.

Secondly, one of the most compelling reasons for not using animal protein is the cost. Protein deficiency afflicts those who cannot afford to buy more or better quality food. Thus, one of the necessary requisites of a high-protein food to be used in developing countries is low cost. Since it is protein malnutrition that these foods must alleviate, the relevant cost is the cost per pound of protein. The following table shows the relative cost per pound of protein for selected food sources.

It can readily be seen that animal protein such as chicken or beef cannot be used in any high-protein foods that are to be marketed as low cost. Also note that dry skim milk, used in many temporary programs to feed children, is still

almost 4 times as expensive as soy flour. It would appear that the most likely protein source for high-protein, low-cost (HPLC) foods are cottonseed flour, fish meal, and soy flour.

TABLE 2 PROTEIN COST OF FOOD SOURCES

Commodity	Protein cost (\$/lb. protein)	Commodity	Protein cost (\$/lb. protein)
Beef (retail)	\$4.44	Dry Skim Milk	\$0.40
Chicken (dressed)	1.50	Wheat (whole)	.30
Wheat Flour	.60	Cottonseed flour	.17
Bulgar Wheat	.47	Fish meal (feed)	.14
Peanut Meal (defatted)	.43	Soy flour (food)	.11

WHO/FAO/UNICEF Protein Advisory Group News Bulletin No. 6.

Roy E. Martin, "Edible Soy Proteins, Challenge and Opportunity," Soybean Digest, Vol. 31, No. 6 (March 1971), p. 45.

Third, many developing countries are very crowded in the habitable areas. This puts great pressure on the ability of the land to supply enough food for the population. Thus, it is necessary to get as much protein as possible from the available farm land.

TABLE 3 PROTEIN YIELD OF FOOD SOURCES

Commodity	Average Yield/acre	Lbs. Protein/acre
Soybean	24.2 bu.	508
Other legumes	20.7 bu.	293
Corn	64.1 bu	323
Wheat	25.1 bu.	180
Milk	2,780 lbs.	97
Beef	342 lbs.	53

WHO/FAO/UNICEF Protein Advisory group Bulletin No. 6

The animal sources of protein such as beef offer very low yields per acre of land. Milk production also uses land inefficiently, giving less than one-fifth the yield of protein that soybeans do.

There are several sources of protein from non meat foods that are looked upon as being potentially useful in the battle against malnutrition. Some are rather exotic and will require much more technical development before they can be used for human food. Others are used today in present high protein low-cost (HPLC) foods. These protein sources are:

1. Soybeans

Combined, Tables 2 and 3 show that from the standpoint of cost and yield, soybeans are an excellent source of protein for HPLC foods. Soybeans are very adaptable and can be structured to resemble almost any food traditionally consumed by the population. Soybeans can also be grown in a variety of climates. It already has been shown that they can be grown in such developing countries as India, Iran, Argentina, Brazil, Columbia, Paraguay, Nigeria, South Africa, Indonesia, and Thailand. Thus their use would allow the local production of the raw agricultural product as well as the final production of the HPLC food. Hopefully, local production would lower the price of the nutritious foods and provide the buying power.

2. Fortified Grains

Another means of introducing more protein into the diets of developing countries is through the fortification of grains with their limiting amino acids. This effectively increases the protein value of such grains as wheat and corn. One high-protein strain of corn, called opaque-2, is fortified with

lysine and tryptophane which are the limiting amino acids in corn. One advantage of this is that the corn is easily incorporated into the corn dishes of Central and South America. Although there have been some problems with these fortified grains, scientists are optimistic that they can be solved and these fortified grains should be very important in the future.

3. Fish Protein Concentrate

Fish protein concentrate (FPC) is a high-protein powder made from fish. It can be made from presently inedible species of fish and thus allows a more efficient utilization of the food available in the ocean. It is tasteless and odorless and can be stored indefinitely.

4. Petroprotein

Petroprotein is protein produced from petroleum or natural gas. Although it is predicted that its use in human food will not come for at least ten years, many companies are actively developing it. It is likely to find more immediate use in the animal feeding industry.

5. Cottonseed

Cottonseed is used presently as a protein source in some foods in South America. Its use will be held up until there is a sufficient supply of glandless cottonseed available.

6. Other Protein Sources

Peanut meal, sesame flour, quinoa flour, and yucca flour have been used as protein sources. Other more exotic sources of protein are Antarctic krill (small shrimp), seaweed, algae (already used as a pancake flour in the Republic of Chad), sea farming, and urea. As technology is developed, some of these may become more important as human food sources.

TYPES OF HIGH-PROTEIN FOODS

There are four basic ways by which the diet of people living in less developed countries can be enriched with protein (Zenoff 1968). Each of these methods has been tried in some part of the world with varying degrees of success.

The first method primarily consists of enriching the existing staple foods which often are some form of cereals. This enrichment can be done in several ways: First, by enriching the raw ingredients before they are made available to households. This would include enriched tortilla flour in Mexico, or enriched corn meal in many Latin American countries. Incaparina in Columbia, Pronutro in South Africa and Rhodesia, and Farina 21 in Senegal are some of the examples. Second, by manufacturing enriched prepared foods which are then directly sold to the consumer. The obvious examples are enriched bread, biscuits and other staple baked goods in many underdeveloped countries. Third, by increasing the nutritional content of certain meats, poultry and fish by proper breeding and feeding procedures. However, this last method is relatively more costly and can only be within the reach of only the affluent segment of the underdeveloped countries.

The second method consists of producing nutritious substitutes for staple foods which are in demand and desired by the masses. This includes milk substitutes and meat substitute. There are too many varieties to mention specific examples but they would certainly include Yoo-Hoo Chocolate Beverage or Beaco Chips. This type of diet enrichment is generally regarded useful when there are serious and persistent shortages of basic staple foods in a country.

The third method consists of introducing radically new products which substantially alter the present dietetic and food habits of people. In other words,

both the product concept and its consumption are substantially different to become major innovations in the society and, therefore, likely to be looked upon as instruments of cultural change. These include a puree for infant feeding in rural areas such as Fafa, a sweetly-flavored porridge recently developed in Ethiopia, a high protein pill or a medicinal protein supplement. As would be expected, most of this type of products have achieved a very slow rate of success.

The fourth method consists of introducing nutritious products in the form of snack and fun foods. The products are not staple items and are generally consumed at a discretionary rate by the people. Finally, the products have universal appeal without regard to social stratification or age stratification. Some of the examples include an enriched soft drink called vitasoy, a candy or a biscuit. Later we shall show that diet enrichment is most likely to succeed if products were marketed primarily as fun, snack foods.

Fortunately, many governments, industries and nonprofit organizations such as Meals for Millions have become conscious of the problem of nutrition. In the words of Dr. Krishnamurthi, Vice President of the Asia Development Bank, "the first generation of problems concerned growing enough food to feed hungry countries. Problems of storage, marketing and distribution will become more important as the second generation of problems".

The primary marketers of high protein foods in developing countries have been the governments of these countries in many instances with the advice and assistance of the U.S. AID Staff. Some private companies such as Coca-Cola, Quaker Oats, Monsanto, CPC International Swift, Nestle, General Mills, and Pfizer have also attempted the marketing of one or two products, often with the support of A.I.D.

In general, most initial government efforts have had only limited success. This can be attributed to a lack of understanding of the basic marketing concept - the satisfaction of consumer needs. The social-psychological factors associated with food are far more important than its nutritional values to the consumer. This is true everywhere, but even more so in developing countries with their traditional cultures. There, any change is viewed with suspicion and the new product is inevitably viewed as inferior to the product it attempts to replace. This will be especially true for the most important foods of a society such as rice or wheat.

Some examples may help to illustrate the point. In India there has been a great increase in wheat production due to the introduction of varieties of Mexican wheat. These varieties are also being bred for higher protein content. Initially, there was great consumer resistance to these improved wheats, some of which has now been overcome. The early wheats were identified by their red color while native Indian wheats are amber. There were also differences in shape, luster and hardness between the native and Mexican wheats. Since Indian shoppers do not buy ground wheat these differences were clearly identified. As the government and plant breeders became aware of this consumer resistance, they developed new varieties which could not be distinguished from native varieties, and resistance to the new varieties vanished. In fact, most shop-keepers did not even distinguish these newer varieties and often mixed them with preferred native wheats.

The major problem currently facing the plant breeders is that of increasing the protein and lysine content without reducing the quality of the chappatis made from the wheat. Since chappatis are the major food of North India, high-protein wheat which made leathery chappatis would not be accepted. One possible solution

is the growing bakery industry of India in the towns and cities. High-protein flour not suitable for chappati making can be used to make excellent bread.

In the Philippines, the initial variety of improved rice bred by the International Rice Research Institute, IR-3, was an enormous success from a production viewpoint, but even when it was introduced, the plant breeders anticipated substantial consumer resistance, which occurred. The principal issue was the texture or the stickiness of the rice, which in turn is a function of the relative amounts of amylose and amylopectin. If there is less amylose the rice is more waxy; if more amylose the rice is harder. Low income households prefer a low amylose rice since otherwise the rice which is cooked in the morning becomes very hard by lunchtime when it is eaten. In the Philippines the preferred amount of amylose is about 20% while the new varieties had amylose contents of 23-30% and thus were considered too hard.

In addition, shoppers identify rice by its color, shape and gloss. Some specialty rices, such as millagrossa, which sell at high prices are scented. IR 8 had a distinctive white spot in its center and was easily identified. Later improved varieties cannot be distinguished in appearance from macan which means any of the ordinary varieties, and wag wag, the best liked higher priced local variety. Since wag wag is well liked and sells at a premium, retail merchants often claim that a rice is wag wag. This is not difficult since there is no clear definition as to what wag wag is. In fact, IR 20 and C 4 are now often sold as Iri wag wag. The principal determinant of what is wag wag is the shape of grain.

New varieties of rice are now tested by a panel of experts at IRRI. These experiments done under carefully controlled conditions are useful, but sometimes

the main reason for consumer dislike is that the rice has different cooking and keeping qualities than the local varieties.

The moral of these examples and many others like them is that the maximum acceptance of new higher protein foods is achieved if these new foods cannot be distinguished from currently used foods. This generalization applies to the principal foods eaten at the major meals. For the major food, however, to label a product as "new and improved" is to doom it to almost certain failure, even if the government mounts as intensive persuasion effort.

The aspects on which the food is judged differ from country to country and even within a country. Some basic marketing research can easily uncover the salient aspects in each locality, and whether the shopper can distinguish the new high protein product from the current one. In most places, a variety of foods are eaten, some more popular than the others as indicated by their prices, such as wag-wag rice in the Philippines.

Color, texture, and shape are important if the grain is purchased unground. The cooking and storing characteristics are very important, even if only minor changes in behavior by the cook are required to yield a product exactly like the current one. Thus, new grains which are just like the old ones except that they need to be cooked a half-hour more or less than the old ones will not be readily accepted.

It might seem like an impossible task to match an existing food, but a perfect matching is not required. There is always some variability between the accepted local foods. It is only necessary as in an analysis of variance, that the variation between the new and current foods be no larger than the variation within

current foods. Once the plant breeders are aware of the salient characteristics, they have been highly successful in matching them in new varieties, particularly on superficial characteristics such as color and shape. The plant breeders' major problem is that as new varieties are found with higher protein content there is likely to be a change in cooking characteristics. Experience suggests that the best grain is not the one with the highest protein content only, but the one with the highest protein content that is acceptable to consumers in the marketplace.

In cities and towns and other places where ground grain is used, the addition of protein additives is much more feasible, since these additives need not change the cooking or baking qualities of the grain. Similarly, legumes that are used in stews that are heavily flavored can be improved nutritionally much more easily than grains such as rice that are eaten without flavoring. Even with no changes in the whole grain, the protein value can be increased by more careful milling, since much of the protein is found in the outside layers of grain.

Unfortunately, most governmental efforts have met little or no success. We think this is due to three distinct factors. First, most efforts at marketing the high protein foods have followed the traditional marketing concept of overemphasizing technology and product and neglecting the customer-oriented approach of working backwards from the customer's viewpoint. Second, governmental efforts have often been limited by starvation budgets relative to allocation of public funds to other activities. Not enough money is spent on research on consumer acceptance of new foods to direct the research and development effort. Finally, the bureaucratic inefficiencies of governments in most less developed countries is as serious and alarming as the problem of nutrition itself. At the same time, the governments have been reluctant to delegate the problems of food supply and nutrition to either

industry or the nonprofit organizations due to serious political implications of playing with basic necessities of their citizenry.

The numerous efforts on the part of the multinational corporations has also met with little or no success (Berg 1972). This failure can be attributed to several factors. First, the food industry has not been able to develop and produce acceptable nutritious foods at a price the needy consumers are able to afford. For example, the retail price of Incaparina in Guatemala is nearly four times higher than that of the cornmeal it replaces. Moreover, while a pound of Incaparina costs 20 cents the per-capita daily income in Guatemala is only 86 cents. In addition, the industry has encountered problems of packaging, raw materials shortages, and tariffs. Second, the food industry could develop good distribution in large metropolitan areas but could not distribute in rural areas where the high protein products were really needed. Third, the market acceptance of the HPLC foods were small and slow because not enough market research was performed before the product development. Accordingly, most HPLC foods have proven to be not profitable to the companies. Finally, most multinational companies expected a welcome policy from the host countries in developing and marketing HPLC foods. Instead, both the governments and the local companies openly expressed suspicion and mistrust of the multinational corporations (Berg 1972).

There are however, a few exceptions to this bleak picture. For example, Incaparina marketed by Quaker Oats in Colombia was proven to be somewhat successful because of strong governmental encouragement and subsidy. Similarly, several high-protein soft drinks including Puma in Guyana and Vitasoy in Hong Kong have succeeded due to strong market acceptance. Unfortunately, the number of failures far exceeds the number of successes. Furthermore, there are only rare spectacular

successes contrary to the expectations of both the industry and the governments. We have summarized from available literature all the known products which are currently still in test markets or which have either failed or succeeded. It should be pointed out that most of the products still under testing have proven difficult to market on a national level.

TABLE 4 HIGH-PROTEIN FOODS SUMMARY

No.	Country	Product and Comments	Success, Failure, or Test Market
1.	Brazil	<u>Incaparina</u> Temporarily successful as an additive to cuscuz (steamed bread) until runaway inflation took hold. Raw material cost became too high.	F
2.		<u>Saci</u> Chocolate flavored soy beverage marketed by Coca Cola. Named for a prankster in Brazilian folklore, Advertising stresses "fun" aspects.	TM
3.		<u>Cerealina</u> Used for infant feeding. Marketed by CPC International. Reports so far say it did not do too well.	TM
4.		<u>Puma</u> Noncarbonated soy beverage. Developed by Monsanto (AID).	TM
5.		Traditional food "Fuba" fortified with soy flour, Krause Milling (AID).	TM
6.		Milk-like beverage dry mix composed of soy flour and dry milk. Marketed by Swift (AID).	TM
7.		Unknown product marketed by the Nestle Co.	TM
8.		Textured soy protein in sausage type food. Marketed by Swift (AID).	TM
9.	Colombia	<u>Incaparina</u> Used as a hot drink or porridge. Marketed by Quaker Oats. Costs have been held to 11¢/lb. (for 20 to 25 servings).	S

TABLE 4 HIGH-PROTEIN FOODS SUMMARY (Continued)

No.	Country	Product and Comments	Success Failure, Or Test Market
10.	El Salvador	<u>Duryea</u> High-protein cereal. Marketed by CPC International.	TM
11.		<u>Incaparina</u> Failure attributed to poor packaging, unacceptable taste, image of being a medicine due to high promotion of nutritional aspects.	F
12.		<u>Frescavida</u> Beverage powder, developed by Pillsbury (AID).	TM
13.	Ethiopia	<u>Faffa</u> Sweetly flavored porridge. Faffa means "grow big and strong."	S
14.	Guatemala	<u>Incaparina</u> cooked as a thin gruel. Lost money first 5 years, now very successful. Advertising avoids poor people connotation.	S
15.	Guyana	<u>Puma</u> Noncarbonated soft drink developed by Monsanto. Now outsells Pepsi and Coke. Price at approximately 10¢ a bottle. Puma now sells 10 million bottle per yr.	S
16.	Hong Kong	<u>Vitasoy</u> Fortified soy beverage. Produced by K.S. Lo since 1940. Has 25% of the soft drink market. Now outsells Pepsi.	S
17.	India	<u>Nutro Biscuit</u> High-protein bakery product.	TM
18.		<u>Protinex</u> Medicinal protein supplement Marketed by Chas. Pfizer.	TM
19.		Cottonseed protein concentrate, Marketed by Dorr-Oliver (AID).	TM
20.		Oilseed protein foods. Marketed by Swift (AID).	TM
21.		<u>Amul</u> Widely respected infant food. Marketed by Kaira Co-operative Union.	S

TABLE 4 HIGH-PROTEIN FOODS SUMMARY (Continued)

No.	Country	Product and Comments	Success, Failure, or Test Market
22.	Indonesia	<u>Saridele</u> Vitamin and mineral fortified soy beverage. Originally had problems of uniformity and quality of raw materials.	S
23.	Iran	<u>Yoo Hoo</u> Flavored milk substitute beverage, Four flavors available.	TM
24.	Kenya	Soy flour or other oilseed protein beverage. Marketed by Del Monte (AID).	TM
25.	Lebanon	<u>Aubina</u> Made from wheat, Egyptian chick pea, bone ash, and skim milk.	TM
26.	Nicaragua	<u>Incaparina</u> Failure attributed to poor management and poor product formation.	F
27.	Nigeria	<u>Fish Protein Concentrate</u>	TM
28.	Pakistan	Textured oilseed protein foods. Marketed by General Mills (AID).	TM
29.	Peru	<u>Peruvita</u> Flour made from cottonseed, skim milk, quinta flour. Problems of raw materials availability and poor product formulation.	F
30.	Rhodesia	<u>Pronutro</u>	TM
31.		<u>Nutresco</u> Made from corn, fish flour, soy flour, and skim milk.	TM
32.	Senegal	<u>Farine 21</u>	TM
33.	South Africa	<u>Pro-Nutro</u>	S
34.	Surinam	<u>Samson</u> Enriched soft drink marketed by Coca-Cola. Clear reddish color noncarbonated drink with a tutti-frutti flavor. Despite nutritive value, it is marketed as a soft drink.	TM

TABLE 4 HIGH-PROTEIN FOODS SUMMARY (continued)

No.	Country	Product and Comments	Success Failure, or Test Market
35.	Taiwan	<u>Sobee</u> Full fat soy flour used for infant Feeding.	TM
36.	Thailand	Imitation hamburger product made from soybeans. Marketed by Archer-Daniels-Midland (AID). Has encountered many problems.	TM
37.	Tunisia	Traditional food "couscous" fortified with high-protein wheat fractions. Marketed by International Milling (AID).	TM
38.	Venezuela	<u>Incaparina</u> Failure attributed to inferior quality product due to problems of raw materials availability. Attempts to use cottonseed as protein source failed because it could not be refined to high quality.	F

(AID) Means companies have developed the product under special three-year U.S. Agency for International Development program.

Table compiled of products reported in available literature.

In our opinion, there are two fundamental factors which seem to be genesis of strong resistance of the market place in adopting the high-protein low-cost foods. Both of these factors are imbedded in the attitudes and value systems of consumers in the less developed countries, which also suggests that marketing concepts may be extremely relevant in solving the problem of malnutrition.

The first factor is the strong cultural norms of traditional societies which reward conformity and punish any tendency to change. The strong cultural and societal norms are especially operating on the basic activities of people such as consumption activities. According to Rogers, "cultural resistances to new ideas are often found in food habits. In India, for example, sacred cows roam the countryside while millions of people are undernourished. Pork cannot be consumed

by moslem countries. Polished rice is eaten in most of Asia and the United States even though whole rice is more nutritious. Food habits are generally imbedded deeply in a society's traditions; they are affected directly by cultural values (Rogers 1962, p. 47).

It is therefore, not surprising that the President's Science Advisory Committee of 1967 emphasized that in order to be effective for a maximum group of people, a method of providing protein must do so with a minimum change in the food or dietary patterns, in cultural practices or in food habits (Goldblith 1970). In short, if some ingredient is added to their native foods resulting in a texture, appearance or flavor foreign to that which is familar in that type of food, the acceptance level of the so called "improved" food is likely to be very low or almost non-existent (Johnson 1966).

What is surprising, however, is the fact that the basic factor of cultural norms and traditionalism of people have been grossly neglected in many efforts to develop and market HPLC foods.

The second factor relates to people's perceptions of new HPLC foods as innovations. The development and especially the marketing of HPLC foods have often taken a course of action which has projected the image of those foods less than ideal innovations to the people. For example, people do not perceive a strong relative advantage in new foods if promoted as nutritious foods because to them the concept of nutrition is often meaningless. The problem is that poor, under-nourished peoples may not understand the concept of nutrition and are sometimes difficult to reach through newspaper, radio and television promotion. It may be very difficult to convince them to buy a "preventative" type of food to combat a deficiency which they cannot readily perceive, for many are living under the

umbrella of "fatalism" with a resignation to the inevitability of the forces of nature (Zenoff, 1968, p. 70). Thus, Incaparina failed in El Salvador because it was promoted on the basis of nutrition; people could not perceive the relative advantage to make up for its different taste. In fact, the unusual taste combined with the nebulous promotion of nutrition gave the product an image of being some sort of medicine. Since most people in less developed countries associate nutrition with calories (if the belly is full, you are healthy). Incaparina was felt not needed because there were no visible sicknesses for which they needed a medicine.

Often the new HPLC foods are also not compatible innovations. As we discussed earlier, soybeans are the best source of protein. However, it typically has a very distinctive taste. Thus it has proven very difficult to develop products which are fully compatible with people's existing food consumption habits. For example, in India the taste of soybeans is generally unacceptable. Furthermore, recently some poorly formulated soy foods made from a strain of soybeans unsuitable for human consumption were recently introduced in India which has probably set back the efforts to diffuse nutrition in that country. Even in countries which do not have a strong dislike of taste of soybeans, the usefulness of the HPLC foods developed from soybeans is still a problem because the taste is distinctly new and different.

Fortunately, it is now possible to produce soy protein concentrate which has no soluble sugar to detract from flavors (Scott and Aldrich 1970). However, the cost of such soy protein extract is considerably greater. With the newer higher cost protein sources, almost any existing product can be simulated in taste, texture and appearance. The lack of undesirable taste and ability to be artificially flavored makes such foods acceptable to people even though the cost may be higher in manufacturing them.

In summary, most HPLC foods have struggled to survive in the market place despite a dire need of nutrition partly because the social and cultural norms a barrier to the adoption of new foods and partly because there are no perceived relative advantages in their acceptance from the viewpoint of the consumers.

RELEVANCE OF MARKETING TO PROBLEMS OF MALNUTRITION

It is our opinion that marketing can contribute immensely toward assisting in the diffusion of HPLC foods in less developed countries. In fact, we think without taking into consideration the modern concepts of marketing theory, it is probable that most existing efforts are likely to fail. How can marketing provide insights into the problem of diffusing HPLC foods?

In Figure 1, we summarize a number of marketing-oriented suggestions and recommendations. In general, we think the first most critical factor in the success of HPLC foods is the development of right types of products. The second most critical factor is the appropriate distribution of the products. The third critical factor is promotion. Finally, pricing strategies will become important when the first three factors are fully incorporated in the struggle to diffuse HPLC foods.

We strongly believe that considerable basic marketing research remains to be done to first understand the existing consumption habits of people in the less developed countries. Unfortunately, most PHLC products have been developed and marketed without regard to the existing food habits of people. In short, typical of most business activities, the industry and the governments have been technology-oriented in their developments of HPLC foods and have ignored the customer-oriented marketing approach.

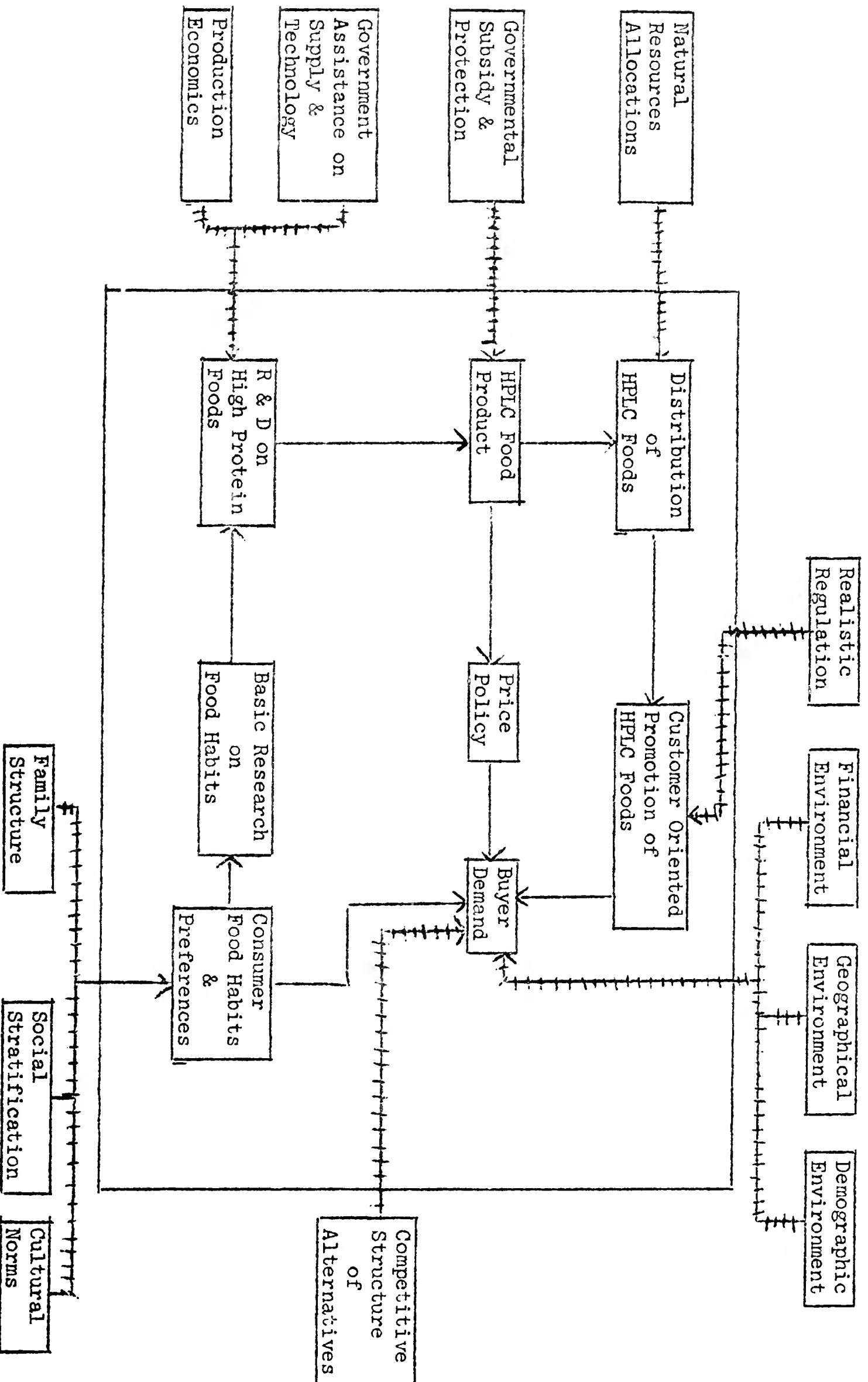


FIGURE 1
A FRAMEWORK OF MARKETING-ORIENTED APPROACH TO
THE PROBLEM OF NUTRITION

We seriously believe that R & D should be guided by basic marketing research on people's existing habits and preferences in their efforts to develop new products. Based on the cumulative experiences of failures and some successes of HPLC foods, it is our contention that the greatest potential lies in developing fun, snack products which are supplemental to regular meals rather than in developing meal substitutes or meal enrichment products. First of all, meal substitutes and meal enrichment products are very difficult to manufacture at a level acceptable to the people. Second, most meal substitutes acquire the stereotype of certain social strata in a country. In other words, they are not classless or universal products. Third, the supplemental in-between meals snack products tend to be most compatible to the eating habits of children and young adults. Finally, the new foods, if marketed as snack items, tend not to replace existing habits but introduce new habits. There is likely to be less resistance in adopting new habits and behaviors so long as they are not perceived as threats to existing norms and behaviors. We think marketing of fun snack products will be easier to this extent.

We also believe that the beverage format of HPLC foods may be more profitable than the solid food format. Interestingly, there are very few existing alternatives in the beverage format. The most common tends to be water or tea or coffee. On the other hand, solid foods have a sufficient variety of existing alternatives with which the consumers are inevitably likely to compare the new foods. Thus, it may be easier to inculcate newer tastes in new foods in the beverage format because very few cultural norms may act as barriers to change.

It is critical that the new product concept should be one which is also capable of making the largest possible use of locally available raw materials. We think the

governments can be extremely useful in ensuring the proper supply of the raw materials by bringing about some fundamental changes in agriculture and economic incentives. For example, soybeans have been introduced on the soil of India with the governmental approvals and assistance so that today the raw material problem with respect to the supply of soy protein concentrate is not a serious problem in that country. We also believe that the problem of nutrition is serious enough for most underdeveloped countries to divert a substantial part of national resources in developing technology of economically producing the proteins. We think investment in basic research in this area is beyond the realm of private industry unless there is some industrywide cooperative effort. However, it seems quite feasible for the governments of the countries to make a long term commitment on producing economically efficient sources of proteins.

Even if the products were developed and produced by working backwards from the customer's existing habits and preferences, the most common problem encountered in less developed countries is the lack of an efficient distribution system. This is especially true in rural areas of the country. Unfortunately, the bulk of the population lives in rural areas and the nutritional deficiency is generally higher among rural segments of the population. At the same time, it is most difficult and extremely costly for a company to develop its own distribution system. The role of the governments seems even more critical in the area of distribution.

Given the critical role which distribution plays in less developed countries, it is not surprising to understand why many high protein beverages have succeeded in several parts of the world. The distribution of soft drinks and other beverages typically tends to be decentralized due to the franchise system. The dependence on regional markets thus has forced many soft drink industries to develop distribution systems which penetrate deep into the rural areas of a country. In fact, it is

this vast distribution network which has enabled Coca-Cola to virtually dominate the markets in most parts of the world. This is yet another reason why we believe that a beverage format for high protein foods may be more successful.

Perhaps the single most factor in many failures to market otherwise acceptable HPLC products has been the gross misunderstanding of the role of promotion. Unfortunately, too many companies and governmental agencies still believe that promotion is tantamount to marketing and that promotion is an extremely powerful change agent to bring about fundamental changes in people's attitudes and behavior. A false sense of power has been, therefore, perceived in the persuasive capabilities of mass media. Often, the industry and the governments have thus ignored the basic understanding of consumer behavior realities on the presumption that with the adequate utilization of mass media it will be possible to bring about mass changes.

We believe that promotion and mass media may be extremely useful in the marketing of HPLC foods but not as persuasive change agents. Promotion on the other hand, is likely to be most useful in enhancing the product's form and place utilities which the people are already predisposed to perceive and receive. In other words, promotion is likely to be more effective in its role as triggering agent and as the reinforcer of existing beliefs. It must be, therefore, utilized only as a supportive medium and not as a substitute.

The above presumption immediately leads to a number of implications. First, it is futile to promote HPLC foods as nutritious products essential to survival. Perhaps it is much better to promote the high protein foods on some other attributes such as modernity, fun, convenience, etc. and the nutritional element should be subordinated in importance. Most products which have succeeded so far seem to have followed this promotional strategy. Examples include Saci in Brazil

and Vitasoy in Hong Kong. Second, the promotional appeals with respect to nutritional aspects must be simple and noneducational. Most people in less developed countries do not know the concept of protein, and only recently have they begun to understand other aspects of nutrition such as vitamins. However, most people do know that some foods are more valuable than others because they are preventative or curative in nature for some diseases. We believe it is important that the promotional effort should capitalize on these past beliefs. However, the market realities suggest that educational-persuasive role of promotion in marketing of high protein foods in less developed countries is substantially limited. Mass media tend to be disproportionately distributed in most less developed countries. While it may be easier to transfer the technology of media allocation from advanced countries to metropolitan areas of underdeveloped countries, mass media needs to be specifically developed for the rural areas. Perhaps the role of promotion is significantly greater in rural areas than that of advertising. Hence, sampling, displays and POP-type promotion may be more appropriate in rural areas. Giving free samples of new food products, particularly soft drinks and snacks is a costly but highly effective method everywhere. Sampling becomes even more necessary in rural areas because of the ineffectiveness of advertising.

The role of opinion leadership in new product adoption must also be recognized. Governments and foreign marketers often forget that the opinion leaders for villagers are the village chiefs and elders and certainly not the central government or the people in cities. Unlike the two-step flow of influence in developed countries where opinion leaders use mass media for information, rural opinion leaders obtain information almost exclusively from personal contacts. This suggests that the use of sales personnel is vital and that impersonal mass media techniques are not appropriate substitutes.

We also believe that while price is an important consideration, its role in marketing of high protein foods has been exaggerated. This can be the only inference one can draw from the successful diffusion of a number of premium-priced branded foods in rural areas including Coca-Cola and instant coffee. In fact, in countries such as India, the farmer today seems to be economically better off than his counterpart industrial worker in a metropolitan area due to large scale allocation of national resources to agriculture.

We believe that many high protein foods have failed in the market place due to their lack of compatibility with people's habits and norms although the failures have been rationalized as due to higher unit or absolute prices. We, therefore, imply that it is more critical to develop those types of proteins which can produce meal supplements or even meal substitutes palatable to existing tastes even if the cost of developing them is likely to be higher. This is especially relevant in the children and young adult markets. Finally, it is once again here that governments can benevolently intervene to provide subsidies at least in the infant stages of product growth.

This whole discussion of soft drinks and snacks may appear to some to be a frivolous response to an extremely critical problem, comparable to Marie Antoinette's remark, "Let them eat cake." We would argue vigorously that just because soft drinks and snack food are not basic foods intimately connected with the behavior of the traditional society, they are more likely to be adopted and to contribute to improvements in nutrition than are programs which attempt to change basic behavior.

FOOTNOTES

1. We wish to express our sincere appreciation to James Thretheway and Padmini Ramaswamy for their assistance in gathering background materials for this paper.
2. This is not to imply that there are likely to be no limits to industrial growth sometime in the future. Although we do not fully agree with the assumptions underlying the study carried out at MIT (Meadows et. al. 1972), we certainly believe that some of the limits to growth suggested in that study may become realities within the next hundred years.

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